

## **APPENDIX H: SAFETY RISK ASSESSMENT**

Navigation Safety Risk Assessment

Id.	Event	Portion of Route	Risk Factors	Likelihood and Consequences			RIN
				Minor	Moderate	Major	
1	Collision (with pilot boat)	Approach to / vicinity of pilot station	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness while taking pilot on board</li> <li>• Mechanical / system failure while maneuvering to pick up / discharge pilot</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Other vessel traffic (particularly vicinity of Point Judith / approaches to Narraganset Bay)</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Weather conditions</li> <li>• Time of day (day vs. night)</li> </ul>	3.87	3.07	1.93	1799.70
2	Collision - LNG carrier	Approach to / vicinity of pilot station	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigation decisions by vsl crew while approaching pilot station</li> <li>• Loss of situational awareness while taking pilot on board</li> <li>• Mechanical / system failure while maneuvering to pick up / discharge pilot</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Other vessel traffic (commercial and recreational) in area</li> </ul> <b>Navigaitonal Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Time of day (day vs. night)</li> </ul>	3.00	2.20	2.00	924.43
3	Collision - LNG carrier	Block Island Sound	<b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Crossing ferry routes</li> <li>• Meeting large commercial vessels transiting Block Island Sound</li> <li>• Crossing routes commonly used by recreational vessels</li> <li>• Large number of commercial lobster boats and draggers working off the Rhode Island coast</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Time of day (day vs. night)</li> <li>• Time of year</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Mechanical / system failure when in vicinity other vessels</li> <li>• Navigational decisions</li> </ul>	3.07	3.00	2.27	6586.25

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				Minor	Moderate	Major	
4	Collision - LNG carrier	The Race	<b>Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Relatively narrow channel</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion - commercial and recreational fishing activity</li> <li>• Vessel congestion - meeting other vessels (recreational and commercial) transiting</li> <li>• Vessel congestion - sailing regattas</li> <li>• State of tide - different users time activities (through transits, working gear, etc.) around tide</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Weather conditions</li> <li>• Current</li> <li>• Time of day (day vs. night)</li> <li>• Time of year</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure</li> </ul>	3.47	3.20	2.33	11274.61
5	Collision (small craft at edge of shipping lane)	The Race	<b>Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Relatively narrow channel</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Current</li> <li>• Reduced visibility in fog</li> <li>• Time of day (day vs. night)</li> <li>• Weather conditions</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Concentrations of smaller vessels at edge of shipping lane</li> <li>• Time of year</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Recreational vessel operator losses situation awareness while clearing channel in advance of LNG carrier transit</li> <li>• Lack of recreational vessel operator training</li> <li>• Mechanical / system failure</li> </ul>	3.73	3.07	2.20	4816.07

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				Minor	Moderate	Major	
6	Collision - LNG carrier	Eastern Long Island Sound	<b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion - recreational and commercial vessels queuing to transit The Race after LNG carrier transit or pushing to transit prior to LNG carrier passage</li> <li>• Crossing ferry routes, meeting large commercial vessels transiting Sound</li> <li>• Heavy concentration of smaller commercial and recreational vessels</li> <li>• Vessel traffic transiting Plum Gut</li> <li>• Time of year</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Heavy current</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigational decisions</li> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure</li> </ul>	3.67	3.00	2.13	3168.04
7	Collision - LNG carrier	Central Long Island Sound	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness meeting large commercial vessels transiting Sound</li> <li>• Mechanical / system failure when in vicinity other vessels</li> <li>• Navigational decisions</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion</li> </ul>	2.93	2.13	1.20	21.01
8	Collision - non-LNG carriers	Vicinity of FSRU	<b>Traffic Conditions/Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Proposed location is in an area of open water that historically has been transited by tankers headed to Northport and tug/tows transiting east/west through the Sound</li> <li>• Proximity of east/west transit routes to FSRU</li> <li>• FSRU creates a 'blind spot' - obstructs visibility</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Weather conditions</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness while LNG carrier maneuvering to approach FSRU</li> <li>• Mechanical / system failure while maneuvering</li> </ul>	2.87	2.20	1.93	591.72

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				Minor	Moderate	Major	
9	Collision - LNG carrier	Western Long Island Sound	<ul style="list-style-type: none"> <li>• LNG carriers not expected to transit this area</li> </ul>	0.93	0.93	0.93	0.64
10	Allision - LNG carrier (with ATON)	Approach to / vicinity of pilot station	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Mechanical / system failure</li> <li>• Navigational decisions</li> <li>• Loss of situational awareness</li> </ul>	1.00	1.00	1.00	1.00
11	Allision - LNG carrier (with ATON)	Block Island Sound	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Mechanical / system failure</li> <li>• Navigational decisions</li> <li>• Loss of situational awareness</li> </ul>	1.00	1.00	1.00	1.00
12	Allision - LNG carrier (with ATON)	The Race	<b>Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Relatively narrow channel</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion - fishing activity</li> <li>• Vessel congestion - vessels transiting</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure</li> </ul>	1.87	1.27	1.07	1.80
13	Allision - LNG carrier (with ATON)	Eastern Long Island Sound	<b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion</li> <li>• Crossing ferry routes</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigational decisions</li> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure</li> </ul>	1.00	1.00	1.00	1.00
14	Allision - LNG carrier (with ATON)	Central Long Island Sound	<b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion</li> <li>• Crossing ferry routes</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigational decisions</li> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure</li> </ul>	1.00	1.00	1.00	1.00
15	Allision with FSRU by non-LNG carriers transiting in vicinity of FSRU	Waters adjacent to FSRU	<b>Traffic Conditions / Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Proposed location is in an area of open water that historically has been transited by tankers headed to Northport and tug/tows transiting east/west through the Sound</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Reduced visibility in fog</li> <li>• Time of day - background lighting on FSRU obstructing navigation lights on vessels</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness by other vessels transiting in vicinity of FSRU</li> </ul>	2.93	2.33	2.20	3629.14

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				Minor	Moderate	Major	
16	Allision with FSRU by LNG carriers while mooring or getting underway	Waters adjacent to FSRU	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Mechanical / system failure</li> <li>• Decisions by mooring master, pilot, tug master</li> </ul>	3.83	2.07	1.13	20.65
17	Allision (with ATON)	Western Long Island Sound	<ul style="list-style-type: none"> <li>• LNG carriers not expected to transit this area</li> </ul>	0.93	0.93	0.93	0.64
18	Grounding - LNG carrier	Approach to / vicinity of pilot station	<b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Other vessel traffic (particularly vicinity of Point Judith / approaches to Narraganset Bay)</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigation decisions by vessel crew while approaching pilot station</li> <li>• Loss of situational awareness while taking pilot on board</li> <li>• Mechanical / system failure while maneuvering to embark/disembark pilot</li> </ul>	1.87	1.00	1.00	1.06
19	Grounding - LNG carrier	Block Island Sound	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Mechanical / system failure when in vicinity shoal water</li> <li>• Navigational decisions</li> <li>• Loss of situational awareness</li> </ul>	2.00	1.87	1.00	5.87
20	Grounding - LNG carrier	The Race	<b>Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Relatively narrow channel</li> <li>• Bathymetry in The Race</li> </ul> <b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Currents</li> <li>• Reduced visibility in fog</li> </ul> <b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion - commercial and recreational fishing activity</li> <li>• Vessel congestion - vessels transiting</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure in vicinity of shoal water</li> </ul>	3.00	2.93	1.87	1022.30
21	Grounding - LNG carrier	Eastern Long Island Sound	<b>Traffic Conditions:</b> <ul style="list-style-type: none"> <li>• Vessel congestion</li> <li>• Crossing ferry routes</li> </ul> <b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigational decisions</li> <li>• Mechanical / system failure in vicinity of shoal water</li> </ul>	2.00	1.93	1.00	7.62
22	Grounding - LNG carrier	Central Long Island Sound	<b>Vessel Conditions:</b> <ul style="list-style-type: none"> <li>• Navigation decision</li> <li>• Loss of situational awareness</li> <li>• Mechanical / system failure in vicinity of shoal water</li> </ul>	1.93	1.87	1.00	5.85
23	Grounding - LNG carrier	Vicinity of FSRU	• N/A	0.00	0.00	0.00	0.00
24	Grounding - LNG carrier	Western Long Island Sound	<ul style="list-style-type: none"> <li>• LNG carriers not expected to transit this area</li> </ul>	0.87	0.87	0.87	0.41

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				Minor	Moderate	Major	
25	Mooring tower failure / FSRU set adrift	Vicinity of FSRU	<b>Navigational Conditions:</b> <ul style="list-style-type: none"> <li>• Heavy weather</li> <li>• Pack ice / ice floes</li> </ul> <b>Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Seismic event</li> </ul> <b>Non-PAWSA Specific:</b> <ul style="list-style-type: none"> <li>• Material fatigue / failure</li> </ul> <b>Traffic Conditions / Waterway Conditions:</b> <ul style="list-style-type: none"> <li>• Allision with FSRU</li> </ul>	2.33	2.13	2.13	2279.80